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CENTRAL INTELLIGENCE AGENCY

REPORT NO. [redacted] 25X1

INFORMATION REPORT

CD NO. 25X1 25X1

COUNTRY Czechoslovakia

DATE DISTR. [redacted]

SUBJECT 1. Model of Soviet Wind Tunnel Built by CKD Stalingrad
2. Personnel at CKD Stalingrad

NO. OF PAGES 5

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NO. OF ENCLS. 2 (3 pages) (LISTED BELOW)

DATE OF INFO. 25X1 [redacted]

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[redacted]

1 In 1946, USSR ordered the prototype (model) of a ventilating plant for mines. This order bore the cover name DR 4 (Mines Russia 4), but the installation is in fact a prototype of a tunnel for testing profiles of jet airplanes. The ventilating plant for mines is only a complementary part of the whole installation. The Soviet order was placed direct by the Management of Czech Heavy Industry, the actual construction taking place in CKD Stalingrad, National Corporation, in Prague-Vysocany. The order should have been finished by 7 July 1951. Many difficulties made it impossible to meet this date. Therefore, a special, composite (komplexni) brigade was formed in order to assist in the co tion of the order. This brigade, under patronage of Manager General of the Ministry of Industry, Dr. Ing. Vaclav Babinger, consists of various experts selected from several factories and research institutes. The new deadline set for the completion of the order was 1 January 1952, but even this date is quite problematic due to many obstacles of a technical nature (insufficient insulation of the tubing, etc.). Dr. Fabinger was called to the USSR for two months and was supposed to be back in September 1951. For scheme of the prototype, see Enclosure No. 1, 1a; for the rotary valve, the most important part of the whole installat on, see Enclosure No. 2.

2 With this model, the problem of continuous regulation of pressure, temperature, and whirl (vortex) is being solved, and critical points are eliminated. The real tunnel, of huge dimensions, may be built somewhere in USSR. The temperature, rotation and pressure of the air and/or oil is measured on individual critical points of the profile (leading and trailing edge of wing, etc.) and further behind the profile. The tests take place under action of cold air (minus 6°C), of hot air (plus 300°C), or of oil (0°C). The special valve (Enclosure No. 1, figure R) supplies the plant with the air; its temperature reaches a maximum of plus 160°C. The supplementary heating is provided by means of an electro-welding set (provisional arrangement). The main difficulties are caused by an insufficient insulation of the piping (loss of heat by radiation). The whole installation was assembled exclusively from German apparatus.

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3. The operation of the factory was placed unde a Soviet production control commission, consisting of six Russian engineers. (Three of them came between August 1 and 10, 1951.) [redacted] 25X1

25X1 [redacted]

Head of the Soviet production control commission	Ing. (fnu) Nikitin, Russian; 28-30 years old; about 170 cm; stout; round face; black curly hair; well dressed man. Originally Chief of Soviet commercial Mission to Prague

4. A partial list of leading factory personnel is as follows:

Factory Manager	Ing. Jindrich Snobl, age 40, 175 cm; stout; oval face; black, greying hair. [redacted] 25X1 representative of the Party; former Manager of Stalin Works in Most. Married, living in Litvinov, President Benes square.
Deputy Manager, head of the sector VTK (research of turbines and compressors):	Ing. (fnu) Spetivy, age 45; 185 cm; oblong, bony face; black, greyish hair; wears glasses. Communist, profiteer.
Production and operation manager	Ing. Jindrich Snobl, identical with the factory Manager.
Workshop chief of the sector VTK	Josef Hakl, 45 years old; 165 cm; stout; round face; black, curly hair; Mild Communist
Section chief of the toolroom	(fnu) Labut, 45 years old; 175 cm; oblong face; black, greying hair, Mild Communist. Married, living in Litvinov VI, Red Army Str.
Section chief of the toolroom	Vaclav Kala, age 35; 165 cm; stout; round face; black, wavy hair; harelip; wears glasses. Paper Communist.
Head engineer of the pump manufacture department	Lubomir Svatos, age 28; 185 cm; stout; round face; black hair; wears glasses when working. Anti-Communist. Chairman of the fencer club CKD Stalingrad.
Head of the electrotechnical parts section II	Ing. (fnu) Gabler, age about 35; about 180 cm; slim; black, thick hair; wears glasses, Ardent Communist
Head of planning and detail drawing	Ing. (fnu) Hlavacek, age 28; 170 cm; muscular; light thin hair. Came from the Slovakian Research Works in Nove Mesto/Vahom

5. Members of the composite brigade for DR 4:

Patron of DR 4	Dr. Ing. Vaclav Fabinger, (General Manager of the Ministry of Industry); 55 years old; 170 cm; stout; round face; white hair; wears glasses. Communist.

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Chief of the electro-section	Ing. (fnu) Polda, employee of REGULA, Nat. Corp. Prague; 35 years old; about 175 cm; stout; oblong face; light hair. Strong Communist, married.
Chief of the thermical section	Docent Dr. Ing. Zdenek Ryska, member of the CSVU (Czechoslovak Research Institute) in Prague-Vokovice; 50 years old; muscular; oblong face; black, greying hair; black eyes; wears glasses when working. Anti-Communist.
Adviser	Dr. (fnu) Kozesnik, Manager of CSVU in Praha-Vokovice; age 45; 170 cm; corpulent; round face; grey, thin hair. Communist.
Chief of the mechanical section	Ing. Vorivoj Hanus, employee of the department VTK in CKD Stalingrad, age 29; 175 cm; slim; oblong face; blond hair, light-blue eyes
Deputy chief of the mechanical section	Ing. Vaclav Hrncir, from CSVU in Prague-Vokovice; 25; 5' 7"; stocky; round face; thin, light blond hair. Paper Communist.
Deputy chief of the electro-section	Ing. (fnu) Jenicek, employee of Regula, Nat. Corp., Prague; 35; 5' 7"; stout; round face; black hair smoothly combed back; bespectacled. Paper Communist.
Engineer of the electro-section	Ing. (fnu) Tomas, from CSVU Prague-Vokovice; 35 , 5' 5"; muscular; oval face; black hair
Mechanic	Zdanek Slaby, from the CSVU Prague-Vokovice; 26; 5' 11"; stout; round face; black curly hair. Anti-Communist
Mechanic	Josef Bricita, from Stalin Works at Most; 21; 6' 00"; stout; round face; black hair and eyes
Mechanic	Lumir Truksa, apprentice, locksmith
Workmen	Three men, 1 locksmith, 1 welder, and 1 unskilled hand

6. The personnel involved on the project were of the highest calibre of scientists and engineers in Czechoslovakia. For example, "Advisor" Kozesnik was a professor in a Technical University, and was known and respected as a very good scientist. He taught mathematics and subjects involving fluid flow and hydrodynamics. Chief Engineer Borivoj Hanus was a student of Professor Kozesnik. He is known as a very brilliant and capable young engineer.

7. The composite brigade is, as far as is known, the first of its kind ever formed in Czechoslovakia for work on a Soviet project. It is customary to form special teams of workers from the factories to expedite the completion of a special shop project on an emergency basis, but this is the first information of the recruiting of a team of such high-calibre scientists.

8. It was not believed by the participants in this project that the firms and institutions involved in the preparation of the model would be allowed to participate extensively in the construction of the full-sized wind tunnel. Possibly minor and very highly specialized components may be manufactured in Czechoslovakia, but it is believed that all major portions of the tunnel will be constructed in Soviet Russia. No information is available on which to base an estimate of the size of this proposed wind tunnel, or on its intended location.

9. Additional technical information is as follows:

a. Channels or t bes shown on diagram, Enclosure No. 1, are all pipes of about the diameter of 2.0 cm. With the insulation (which was referred to as being inadequate) the diameter was about 3.5 cm.

b. The test body was comparatively quite large, and actually occupied a large portion of the length of the tunnel as shown. It was mounted in slots in the top and bottom of the tunnel, but had no device for measuring the drag forces. The tunnel was large enough for a man to work while lying inside. There were no known windows in the tunnel, the only break in the walls being for the entrances of the three leads, M_1, M_2, and M_3 as shown. These three leads terminated at points on the surface of the test body. Lead M_2 apparently can be better interpreted as "turbulence", than flow or vortex.

c. 25X1 [redacted] there was no additional mechanism (such as possibly an expansion turbine) at point R. The small valve which was drawn from his description was supposed to be in itself capable of changing the temperature of the incoming air. When the whole device was rigged up and in operation, [redacted] the two branches 25X1 of the pipe leading from R; one was hot, and the other was cold enough to form frost on the outside of the pipe. This valve R, as indicated on the basic information, was the heart of the whole mechanism. It was considered such an achievement that the whole shop working on the tunnel model was in a mood for a holiday of celebration when the valve worked so well. Engineer Hanus left for Russia with this valve shortly after the tests. [redacted] 25X1
25X1 [redacted] the importance of drilling the holes tangent to the interior surface,
25X1 [redacted] not further enlightened as to the valve's operation.

d. The compressed air source was merely the ordinary plant system of compressed air, and its temperature when delivered to the entrance of the model wind tunnel was ordinary room or ground temperature.

e. The valves, V, shown in the diagram, are merely ordinary standard hand valves.

f. There was no noticed bell shape to the connection of the piping with the cylindrical tunnel, but merely an ordinary perpendicular joint with possibly a flange.

g. The "oil" used in the tunnel circuit was merely ordinary low-viscosity 25X1
oil of a color which Sub-source remembered as yellow. [redacted] 25X1
25X1 the impression [redacted] high quality oil was used, [redacted]
25X1 [redacted]

25X1 [redacted] **Comments**

1. The presence of apparent inconsistencies in this report is to be expected and should not be used as cause for discrediting the basic fact and the associated information that is being reported. This fact is simply:

The Soviets are having a prototype scale model of a large wind tunnel built by the Stalingrad plant of CKD at Prague-Vysocany.

2. From the reported configuration of the tunnel and from the results of discussion with USAF research scientists, it is apparent that it is to be a jet power plant test tunnel. From the reported small size of the duct ng used (which also might be subject to large observational and reporting errors), the prototype tunnel cannot have great significance when used as a small wind tunnel in its own right. The large tunnel represented by the model has intelligence significance of the first order. The unexplained inconsistencies in the report and notes on each are as follows:

a. The existence of valve R for the purpose of controlling temperature from below freezing to very hot with no connection to any external system.

NOTE: This device (known in American literature as the "Hilsch Tube" from the work of Prof. Hilsch at Erlangen University, Germany, and in Germany known as the "Wirbelrohr") was first invented by a Frenchman (name unknown to writer) about ten years ago. Its operation is quite simple, involving centrifugal compression of a portion of the gas, and it has been known to produce under laboratory conditions temperature differences in the order of minus 40°C for the low pressure side, and plus 75°C for the high ILLEGIB [redacted] and cheapest for the model wind tunnel described in this report, but it is not known to have been used in applications involving such quantities of air as used in a reasonable sized wind tunnel.

b. The airfoil shape shown in the tunnel has no place in what otherwise appears to be a reasonable type of layout for a power plant test tunnel. 25X1

[redacted]

c. The reason for pumping "oil" through the circuit of a prototype wind tunnel has no specific explanation.

NOTE: There are a number of possible explanations for the existence of this fluid in the test setup. First, other circuits may exist, not seen by source, which circulate fluid carrying a light polarizing agent for studying flow. Its operation would then be similar to that of the small fluid tunnel in the U.S. at California Institute of Technology. Possibly, however, this oil has another and much more simple use.

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d. There is not enough involved in the part of the wind tunnel [redacted] 25X1 [redacted] to involve five years of work (1946-1951) by a factory such as CKD is indicated as being.

NOTE: This may probably be explained by the fact that the main part of the mechanism, that described as the mine-ventilating plant [redacted] 25X1 25X1 [redacted] is the power section of the tunnel, and possibly the most difficult, time-consuming, and expensive to develop. Also the order date of 1946 must be given the same allowance for error as the rest of the report.

3. Previous information on the construction of a wind tunnel for aerodynamic measurements (for the USSR), manufactured in CKD Stalingrad, was contained in a report from a low-grade source, dated 6 February 1949, as follows: "CKD manufactures and delivers for USSR 3 ventilators (fans) with capacity of 170,000 cubic meters per hour designed for tunnels to test model airplanes. Tunnels have to work with temperature up to minus 40° Celsius and with speeds over Mach's unit. According to expert's opinion this is a novel construction never produced elsewhere before."

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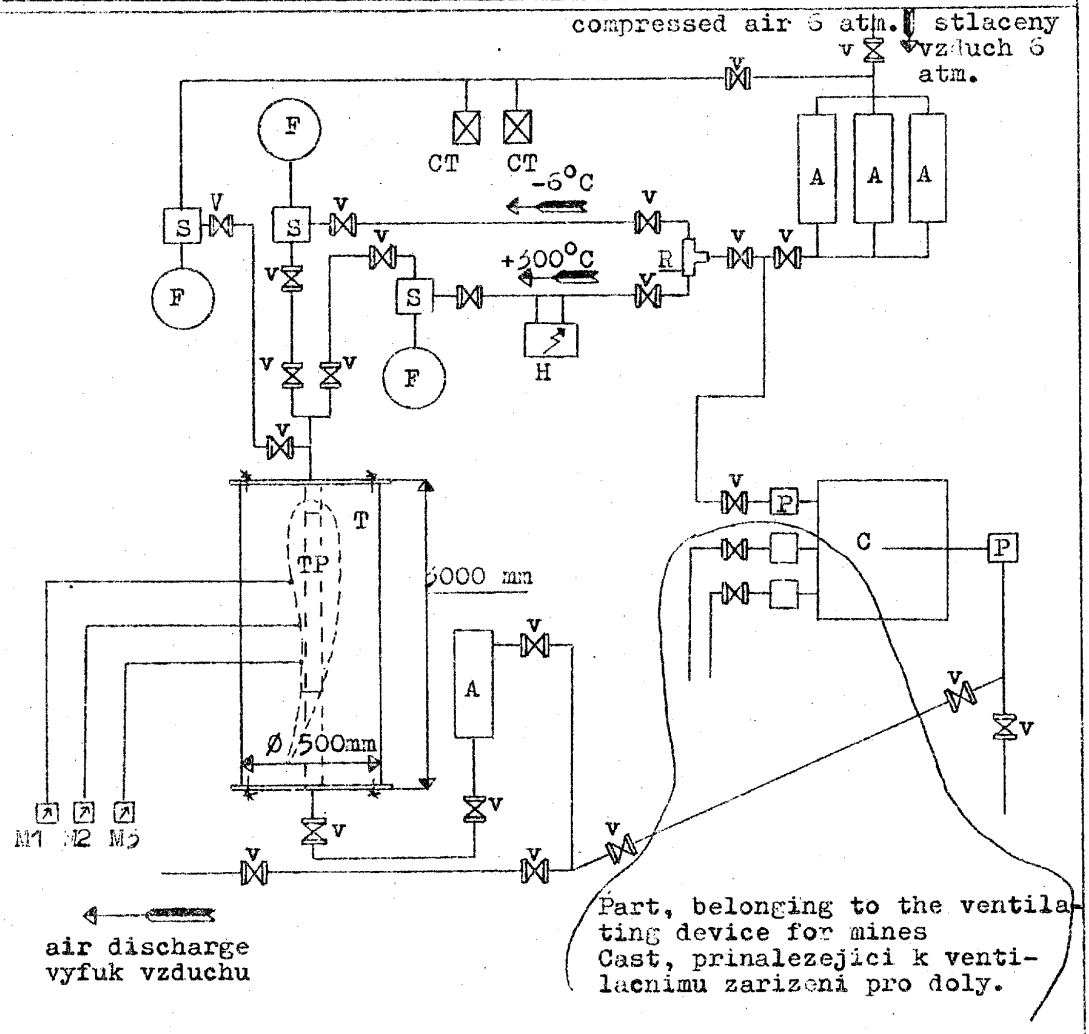
CKD, National Corporation, Workshop STALINGRAD, Praha-Vysocany.
CKD, Narodni Podnik, Zavod STALINGRAD, Praha - Vysocany.

DR 4 order for USSR - scheme of the testing tunnel. Encl. # 1.
Zakazka DR 4 pro SSSR - schema modelu tunelu. Pril.c. 1.



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CKD, National Corporation, Workshop STALINGRAD, Praha-Vysocany.
CKD, Narodni podnik, Zavod STALINGRAD, Praha - Vysocany.

Explanatory notes to the encl. # 1.
Vysvetlivky k priloze cis.1.

Enclosure # 1a.
Priloha cis.1a.

A. Ascania - apparatus for regulating of a continuous and regular air flow
Ascania - pristroj pro regulaci pravidelneho toku vzduchu

F. Flaps - apparatuses for regulating pressure
Klapky - pristroje pro regulaci tlaku

S. Servo-motors (boosters)
Servomotory

T. Testing tunnel
Zkusebni tunel

R. Rotatory(centrifugal) valve (air temperature -6°C, +160°C)
Rotacni(odstredivy) ventil (teplota vzduchu -6°C, + 160°C)

H. Supplementary source of heat(Electro-welding set)
Doplnkovy zdroj tepla(Elektricka svarecka)

P. Oil pumps
Cerpadla oleje

C. Oil container
Nadrz s olejem

M1. Instruments for measuring of air and oil temperature(indicators)
Pristroje na mereni teploty vzduchu a oleje(indikatory)

M2. Instruments(indicators) for measuring of air and oil flow(oil whirl and air vortex)
Pristroje(indikatory) na mereni rotace(vireni) vzduchu a oleje

Mp. Instruments(indicators) for measuring of air and oil pressure
Pristroje(indikatory) na mereni tlaku oleje a vzduchu

CT. Cooling towers
Chladici veze

V. Valves
Ventily

TP- Tested profile
Zkouseny profil.

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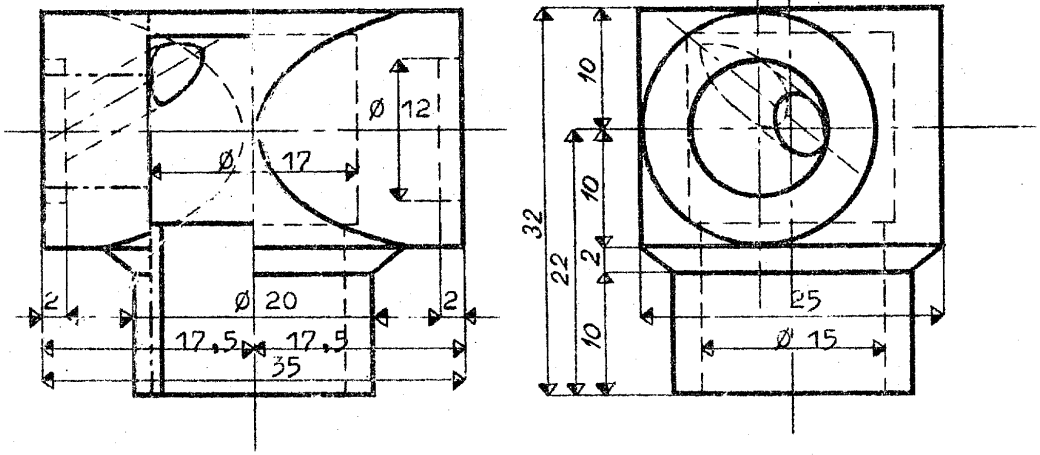
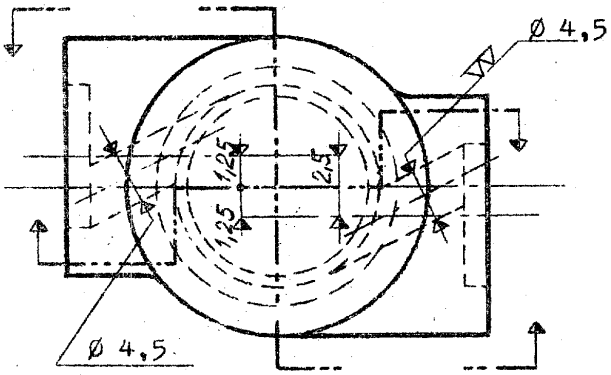
CKD, National Corporation, Workshop STALINGRAD, Praha-Vysocany.
CKD, Narodni podnik, Zavod STALINGRAD, Praha-Vysocany.

Rotary (centrifugal) valve.
Rotacni (odstredivy) ventil.

Enclosure # 2.
Priloha cis.2.





Scale: 2 : 1.
Měr.:

Sizes in mm
Rozmery v mm